Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
WaveSense, Inc.,	)	ET Docket No. 19-241
Request for Waiver of Sections 15.509(b)	)	
and 15.525 of the Commission's Rules for	)	
Use of Ground-Penetrating Radar in	)	
Driver-Assistance Safety Technology	)	

COMMENTS OF THE GPS INNOVATION ALLIANCE

The GPS Innovation Alliance ("GPSIA"), pursuant to the Public Notice ("Notice") issued in the above-captioned proceeding, hereby submits these comments on the WaveSense, Inc. ("WaveSense") Request for Waiver ("Request") filed with the Commission on July 25, 2019.[1] WaveSense seeks a waiver of Sections 15.509(b) and 15.525 of the Commission's Rules for its driver-assistance technology, which relies on ultra-wideband ("UWB") ground-penetrating radar ("GPR") to enable active lanekeeping in challenging environmental conditions.[2] Section 15.509(b) limits operation of ground-penetrating radar technology to law enforcement, firefighting, emergency rescue, scientific research, commercial mining, or construction and Section 15.525 requires an operator of a UWB imaging system to coordinate with federal users through the Commission's Office of Engineering and Technology ("OET") before using the equipment. GPSIA recognizes the promise that WaveSense's GPR system may hold for advancing vehicular automation and appreciates the extent to which WaveSense has committed

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1 *WaveSense, Inc. Request for Waiver*, ET Docket No. 19-241 (filed July 25, 2019) ("Request"); *see* Public Notice, *Office of Engineering and Technology Seeks Comment on WaveSense, Inc., Request for Waiver of Section 15.509(b) and 15.525 of the Commission's Rules for Use of Ground-Penetrating Radar in Driver-Assistance Safety Technology*, DA 19-834 (rel. Aug. 27, 2019).

2 Request at 1.

to analyzing and testing its GPR for potential interference to GPS. However, the Request still has certain deficiencies that should be corrected before the Commission acts. As explained below:

- WaveSense should furnish (1) a copy of OET KDB 908926 and (2) the results of the anechoic chamber measurements WaveSense conducted at GPS frequencies;
- WaveSense should seek a waiver of the 20% minimum fractional bandwidth requirement of Section 15.503 and present justification of why its transmitters should still be treated as UWB devices;
- The FCC should not adopt WaveSense's interpretation of the Headsight Waiver Order[3]; and
- In lieu of a blanket waiver of Sections 15.509(b) and 15.525, the FCC should adopt a condition similar to that in the GSSI Waiver Request[4] that would authorize a limited number of units as evaluation kits for an experimental period of two or three years.

I. WAVESENSE MUST FURNISH FURTHER INFORMATION

In order to remedy the current informational gaps in the record, the Commission should request that WaveSense include in the record a copy of OET KDB Publication 908926 and should provide the data from its anechoic chamber measurements conducted at GPS frequencies. In its Request, WaveSense claims that OET has provided guidance via the Knowledge Database System (*i.e.* KDB Publication 908926) that linear frequency modulated ("LFM") waveforms meet the definition of ultra-wideband as described in Section 15.503 and are not subject to the requirement of Section 15.31(c).[5] However, it does not appear that the KDB publication of which WaveSense cites is available, or at least not publicly available – a screenshot of GPSIA's

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[3] *See Headsight, Inc. Request for Waiver of Part 15 of the Commission's Rules Applicable to Ultra-Wide Band Devices*, Order, 32 FCC Rcd 1511 (OET 2017) ("Headsight Waiver Order").

[4] *See Geophysical Survey Systems, Inc. Request for Waiver*, ET Docket No. 19-155 (filed Apr. 11, 2019) ("GSSI Waiver Request").

[5] *See* Request at n.7.

independent search result is included below as **Exhibit A**. This reference should be provided with the waiver request in order for the Commission to make a decision based on the record.

In arguing that the FCC should waive Section 15.525, WaveSense states that its "GPR technology will comply with … emission levels [for UWB vehicular radar]."[6] The Request also includes a Technical Appendix that "describes four scenarios that were studied based on discussions with staff members of the Federal Communications Commission, the Department of Defense, and the Department of Transportation," the fourth of which was "interference with GPS systems."[7] GPSIA commends WaveSense for having specifically tested its system for potential interference to GPS and believes this is a positive direction for UWB waiver applications in general. However, for the sake of completeness and transparency, and because the Commission must make a decision on the Request on the record, WaveSense should provide the results of the anechoic chamber measurements at GPS frequencies.

II. WAVESENSE SHOULD SEEK A WAIVER OF SECTION 15.503

Based on GPSIA's calculations, it appears that WaveSense also needs to seek a waiver of Section 15.503 of the Commission's Rules. Based on the values provided in the Request, WaveSense's implementation of LFM has a fractional bandwidth of approximately 18.6 % (*i.e.* 2*(403-103)/(403+103) ≈ 1.18577),[8] whereas the FCC definition of UWB is a minimum fractional bandwidth of 20%.[9] In developing the UWB rules, the Commission actively considered various viewpoints on the appropriate bandwidth requirements for UWB devices and adopted a minimum fractional bandwidth of 20%. Transmitters that meet that specific threshold

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6 Request at 6.

7 Request, Technical Appendix at 1.

8 *See supra* n.2.

9 *See* 47 C.F.R. § 15.503.

and other requirements in the rules may obtain certification and operate as a UWB device under the rules. The Commission should require WaveSense to seek a waiver of this fundamental condition and present reasons why it should still qualify as a UWB device even though it does not meet the requirement in the rules.

III. THE FCC SHOULD NOT ADOPT WAVESENSE'S INTERPRETATION OF THE HEADSIGHT WAIVER ORDER

Contrary to WaveSense's argument that the Commission should waive Section 15.509(b) based on the Headsight Waiver Order, the use cases for the Headsight agricultural application and WaveSense's driver-assistance application are fundamentally different, especially with respect to potential for interference to GPS users. In the Headsight Waiver Order, OET found that "Headsight's proposed use of the Terrahawk seasonally, on farm equipment on agricultural land in rural settings and for limited periods of time" was "consistent with the criteria of 'low proliferation and infrequent use' for GPR, because this specific use of GPR in agricultural applications [did not] differ greatly from any other permissible use listed in Section 15.509(b)."[10] WaveSense's driver-assistance GPR technology directed at the mass automotive market cannot reasonably be characterized as a low proliferation and infrequent use application.

IV. IN LIEU OF A BLANKET WAIVER, THE FCC SHOULD INITIALLY AUTHORIZE A LIMITED NUMBER OF EVALUATION KITS

Rather than granting WaveSense a blanket waiver of Sections 15.509(b) and 15.525, the FCC should instead adopt a condition similar to that set forth in the recent GSSI Waiver Request[11] and authorize a limited number (*e.g.*, up to 2,000 units) of evaluation kits for a period of 2-3 years. This initial evaluation period would enable real-world experience with

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[10] Headsight Waiver Order at ¶ 13.

[11] *See* GSSI Waiver Request at 4.

WaveSense's GPR devices at a manageable scale. After the evaluation period, as WaveSense seeks authorizations for higher volume deployments, the company would have several years of operational knowledge to use as a baseline for conducting expanded testing to confirm the validity of WaveSense's original analysis and anechoic chamber testing with respect to interference scenarios.

V. CONCLUSION

GPSIA appreciates and supports advances in driver-assistance technology and recognizes WaveSense's good faith efforts thus far to work towards a solution that protects incumbent operations. However, while not necessarily opposed to WaveSense's Request, GPSIA respectfully requests that the Commission defer any action on the requested waiver until WaveSense provides all of the information requested herein. Moreover, the Commission should require WaveSense to seek a waiver, with appropriate justification, of the definition of a UWB device in Section 15.503. Finally, GPSIA encourages the FCC to refrain from adopting WaveSense's interpretation of the Headsight Waiver Order and to consider conditionally granting a limited number of evaluation kits for 2-3 years in lieu of a blanket waiver of Sections 15.509(b) and 15.525.

Respectfully submitted,

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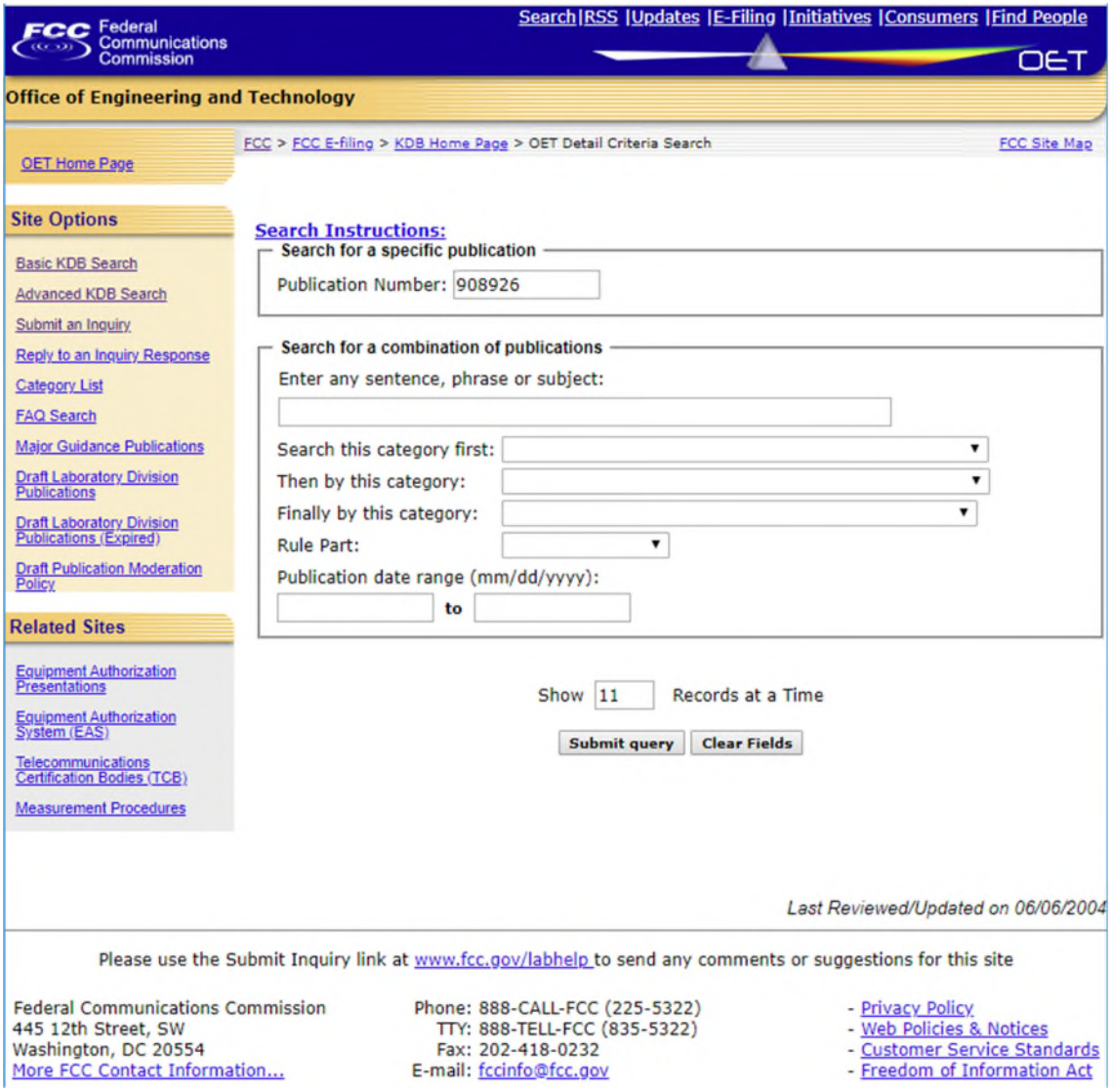
Dated: September 16, 2019

Exhibit A



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